

Air Quality Permit

Issued To: Montana Power Company
40 East Broadway
Butte, MT 59701

Permit #3170-00
Application Complete: 07/30/01
Preliminary Determination Issued: 09/05/01
Department Decision Issued:
Permit Final:
AFS #049-0015

An air quality permit, with conditions, is hereby granted to the Montana Power Company - Main Line #4 Compressor Station (Montana Power-Main Line #4) pursuant to Sections 75-2-204 and 211, Montana Code Annotated (MCA), as amended, and Administrative Rules of Montana (ARM), 17.8.701, *et seq.*, as amended, for the following:

Section I: Permitted Facilities

A. Plant Location

Montana Power - Main Line #4 proposes to operate a natural gas compressor station and associated equipment. Montana Power - Main Line #4 is currently considering two sites approximately 1 mile apart. Both sites are located approximately 17 miles northwest of Helena, near Silver City, in Lewis and Clark County, Montana. Site #1 is in the SE $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 35, Township 12 North, Range 5 West. Site #2 is in the SW $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 36, Township 12 North, Range 5 West. A list of the permitted equipment is contained in the permit analysis.

B. Current Permit Action

On July 30, 2001, Montana Power - Main Line #4 submitted a request for a pre-construction air quality permit to build a new natural gas compressor station. The facility would include the installation and operation of three 1600-hp Solar Saturn turbine-driven compressors.

Section II: Limitations and Conditions

A. Emission Limitations:

1. Emissions from each of the three 1600-hp Saturn Solar compressor turbines (units #1, #2, and #3) shall not exceed the following (ARM 17.8.710):

NO _x	7.26 lb/hr
CO	2.01 lb/hr
VOC	0.56 lb/hr

2. Montana Power - Main Line #4 shall not cause or authorize emissions to be discharged into the outdoor atmosphere from any sources or stacks installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes (ARM 17.8.304).
3. Montana Power - Main Line #4 shall not cause or authorize emissions to be discharged into the atmosphere from haul roads, access roads, parking lots, or the general plant property without taking reasonable precautions to control emissions of airborne particulate matter (ARM 17.8.308).
4. Montana Power - Main Line #4 shall treat all unpaved portions of the access roads, parking lots, and general plant area with fresh water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.3 (ARM 17.8.710).

B. Testing Requirements:

1. Montana Power - Main Line #4 shall test each of the three 1600 hp Solar Saturn compressors for NO_x and CO, concurrently, to demonstrate compliance with the NO_x and CO emission limits contained in Section II.A.1 within 180 days of initial start up of the turbines. Further testing shall continue on an every 4-year basis or according to another testing/monitoring schedule as may be approved by the Department of Environmental Quality (Department) (ARM 17.8.105 and 17.8.710).
2. All compliance source tests shall be conducted in accordance with the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).
3. The Department may require further testing (ARM 17.8.105).

C. Operational Reporting Requirement:

1. Montana Power - Main Line #4 shall supply the Department with annual production information for all emission points, as required, by the Department in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions identified in Section I.A of the Permit Analysis.

Production information shall be gathered on a calendar year basis and be submitted to the Department by the date required in the emission inventory request and shall be in the units required by the Department. This information is required for the annual emission inventory and to verify compliance with permit limitations (ARM 17.8.505).

2. Montana Power - Main Line #4 shall notify the Department of any construction or improvement project conducted pursuant to ARM 17.8.705 (l)(r) that would include a change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location, or fuel specifications, or would result in an increase in source capacity above its permitted operation or the addition of a new emission unit. The notice must be submitted to the Department, in writing, 10 days prior to start up or use of the proposed de minimis change, or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change, and must include the information requested in ARM 17.8.705(l)(r)(iv) (ARM 17.8.705).
3. All records compiled in accordance with this permit must be maintained by Montana Power - Main Line #4 as a permanent business record for at least 5 years following the date of the measurement, must be available for inspection by the Department, and must be submitted to the Department upon request (ARM 17.8.710).

D. Notification

1. Montana Power - Main Line #4 shall provide the Department with written notification of commencement of construction of the new 1600-hp Solar Saturn turbines within 30 days after commencement of construction.
2. Montana Power - Main Line #4 shall provide the Department with written notification of the actual start-up date of the new 1600-hp Solar Saturn turbines within 15 days after the actual start-up.
3. Montana Power - Main Line #4 shall provide the Department with written notification of the date of manufacture of each of the three-1600 hp Solar Saturn turbines within 30 days after the commencement of construction.

Section III: General Conditions

- A. Inspection - Montana Power - Main Line #4 shall allow the Department's representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, auditing any monitoring equipment (CEMS, CERMS) or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.
- B. Waiver - The permit and all the terms, conditions, and matters stated herein shall be deemed accepted if Montana Power - Main Line #4 fails to appeal as indicated below.
- C. Compliance with Statutes and Regulations - Nothing in this permit shall be construed as relieving any permittee of the responsibility for complying with any applicable federal or Montana statute, rule or standard, except as specifically provided in ARM 17.8.701, *et seq.* (ARM 17.8.717).
- D. Enforcement - Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties or other enforcement as specified in Section 75-2-401, *et seq.*, MCA.
- E. Appeals - Any person or persons jointly or severally adversely affected by the Department's decision may request, within 15 days after the Department renders its decision, upon affidavit setting forth the grounds therefor, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The Department's decision on the application is not final unless 15 days have elapsed and there is no request for a hearing under this section. The filing of a request for a hearing postpones the effective date of the Department's decision until the conclusion of the hearing and issuance of a final decision by the Board.
- F. Permit Inspection - As required by ARM 17.8.716, Inspection of Permit, a copy of the air quality permit shall be made available for inspection by Department personnel at the location of the permitted source.
- G. Construction Commencement - Construction must begin within 3-years of permit issuance and proceed with due diligence until the project is complete or the permit shall be revoked.
- H. Permit Fees - Pursuant to Section 75-2-220, MCA, as amended by the 1991 Legislature, the continuing validity of this permit is conditional upon the payment by the permittee of an annual operation fee, as required by that Section and rules adopted thereunder by the Board.

Permit Analysis
Montana Power Company - Main Line #4
Permit #3170-00

I. Introduction/Process Description

A. Permitted Equipment

The Montana Power Company - Main Line #4 Compressor Station (Montana Power - Main Line #4) facility consists of the following units:

1. (3) 1600-hp Solar Saturn turbine-driven compressors
2. (2) Natural Gas-Fired Generators
3. Miscellaneous heaters

B. Source Description

Montana Power - Main Line #4 proposes the operation of a natural gas processing plant and associated equipment located approximately 17 miles northwest of Helena in Lewis and Clark County, Montana. Montana Power - Main Line #4 is considering two locations within 1 mile of each other. Site #1 is located in the SE¼ of the NE¼ of Section 35, Township 12 North, Range 5 West. Site #2 is located in the SW¼ of the NW¼ of Section 36, Township 12 North, Range 5 West.

The purpose of the Montana Power - Main Line #4 facility is to boost the field gas to the natural gas transmission system. This initial compression of the gas is accomplished with the compressor turbines described above. The heaters provide the heat to the station buildings.

II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the Administrative Rules of Montana (ARM) and are available upon request from the Department of Environmental Quality (Department). Upon request, the Department will provide references for locations of complete copies of all applicable rules and regulations or copies where appropriate.

A. ARM 17.8, Subchapter 1, General Provisions, including, but not limited to:

1. ARM 17.8.101 Definitions. This section includes a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.
2. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emissions of any air contaminant into the outdoor atmosphere shall, upon written request of the Department, provide the facilities and necessary equipment, including instruments and sensing devices, and shall conduct tests, emission or ambient, for such periods of time as may be necessary using methods approved by the Department.

Based on the Department's current requirements, the testing necessary for the three new 1600-hp Solar Saturn Turbines to demonstrate compliance with applicable emission limits is an initial compliance source test. Further testing shall occur on an every 4-year basis or according to another testing/monitoring schedule as may be approved by the Department.

3. ARM 17.8.106 Source Testing Protocol. The requirements of this rule apply to any emission source testing conducted by the Department, any source, or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq.*, Montana Code Annotated (MCA).

Montana Power - Main Line #4 shall comply with the requirements contained in the

Montana Source Test Protocol and Procedures Manual, including, but not limited to, using the proper test methods and supplying the required reports. A copy of the Montana Source Test Protocol and Procedures Manual is available from the Department upon request.

4. ARM 17.8.110 Malfunctions. (2) The Department must be notified promptly by telephone whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation, or to continue for a period greater than 4 hours.
5. ARM 17.8.111 Circumvention. (1) No person shall cause or permit the installation or use of any device or any means which, without resulting in reduction in the total amount of air contaminant emitted, conceals or dilutes an emission of air contaminant which would otherwise violate an air pollution control regulation. (2) No equipment that may produce emissions shall be operated or maintained in such a manner that a public nuisance is created.

B. ARM 17.8, Subchapter 2, Ambient Air Quality, including, but not limited to:

1. ARM 17.8.204 Ambient Air Monitoring.
2. ARM 17.8.210 Ambient Air Quality Standards for Sulfur Dioxide
3. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide
4. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide.
5. ARM 17.8.213 Ambient Air Quality Standard for Ozone
6. ARM 17.8.214 Ambient Air Quality Standard for Hydrogen Sulfide
7. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter
8. ARM 17.8.221 Ambient Air Quality Standard for Visibility
9. ARM 17.8.222 Ambient Air Quality Standard for Lead and
10. ARM 17.8.223 Ambient Air Quality Standard for PM₁₀.

Montana Power - Main Line #4 must maintain compliance with the applicable ambient air quality standards.

C. ARM 17.8, Subchapter 3, Emission Standards, including, but not limited to:

1. ARM 17.8.304 Visible Air Contaminants. (2) This rule requires that no person may cause or authorize emissions to be discharged to the outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.
2. ARM 17.8.308 Particulate Matter, Airborne. (1) This rule requires an opacity limitation of 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate. (2) Under this section, Montana Power - Main Line #4 shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter.
3. ARM 17.8.309 Particulate Matter, Fuel Burning Equipment. This section requires that no person shall cause, allow, or permit to be discharged into the atmosphere, particulate matter caused by the combustion of fuel in excess of the amount determined by this section.
4. ARM 17.8.310 Particulate Matter, Industrial Process. This section requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter in excess of the amount set forth in this section.
5. ARM 17.8.322 Sulfur Oxide Emissions--Sulfur in Fuel. Commencing July 1, 1971, no person shall burn any gaseous fuel containing sulfur compounds in excess of 50 grains

per 100 cubic feet of gaseous fuel, calculated as hydrogen sulfide at standard conditions. Montana Power - Main Line #4 will consume pipeline quality natural gas in the compressor engines and reboilers, which will meet this limitation.

6. ARM 17.8.340 Standard of Performance for New Stationary Sources. This section incorporates, by reference, 40 CFR Part 60, Standards of Performance for New Stationary Sources (NSPS)

40 CFR 60, Subpart KKK, Standards of Performance for Equipment Leaks of VOC From Onshore Natural Gas Processing Plants. Owners or operators of onshore natural gas processing plants, as defined and applied in 40 CFR Part 60, shall comply with standards and provisions of 40 CFR Part 60, Subpart KKK. This subpart does not apply to the Montana Power - Main Line #4 compressor station because it does not meet the definition of a natural gas processing plant as defined in 40 CFR Part 60, Subpart KKK.

40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines. This subpart shall apply to all stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour, based on the lower heating value of the fuel fired and construction, reconstruction, or modification commenced after October 3, 1977. This subpart does not apply to the Montana Power - Main Line #4 facility because each of the turbine-driven compressors has a heat input of 4.29 gigajoules per hour at peak load.

- D. ARM 17.8, Subchapter 5, Air Quality Permit Application, Operation and Open Burning Fees, including, but not limited to:

1. ARM 17.8.504 Air Quality Permit Application Fees. This section requires that an applicant submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to the Department. Montana Power - Main Line #4 submitted the appropriate permit application and fee for the current permit action.
2. ARM 17.8.505 Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to the Department by each source of air contaminants holding an air quality permit, excluding an open burning permit, issued by the Department; and the air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

An air quality operation fee is separate and distinct from an air quality permit application fee. The annual assessment and collection of the air quality operation fee, as described above, shall take place on a calendar year basis. The Department may insert into any final permit issued after the effective date of these rules such conditions as may be necessary to require the payment of an air quality operation fee on a calendar year basis, including provisions which pro-rate the required fee amount.

- E. ARM 17.8, Subchapter 7, Permit, Construction and Operation of Air Contaminant Sources, including, but not limited to:

1. ARM 17.8.701 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.
2. ARM 17.8.704 General Procedures for Air Quality Preconstruction Permitting. This air quality preconstruction permit contains requirements and conditions applicable to both construction and subsequent use of the permitted equipment.
3. ARM 17.8.705 When Permit Required, Exclusions. This rule requires a facility to obtain an air quality permit or permit alteration if they construct, alter, or use an air contaminant source which has the potential to emit more than 25 tons per year of any pollutant.

Montana Power - Main Line #4 has the potential to emit more than 25 tons per year of NO_x and CO; therefore, a permit is required.

4. ARM 17.8.706 New or Altered Sources and Stacks Permit Application Requirements. This rule requires that an application for an air quality permit be submitted for a new or altered source or stack. Montana Power - Main Line #4 submitted the proper application for the current permit action.
5. ARM 17.8.710 Conditions for Issuance of Permit. This section requires that Montana Power - Main Line #4 demonstrate compliance with applicable rules and standards before a permit can be issued. Also, a permit may be issued with such conditions as are necessary to assure compliance with all applicable rules and standards. Montana Power - Main Line #4 demonstrated compliance with applicable rules and standards as required for permit issuance.
6. ARM 17.8.715 Emission Control Requirements. This section requires a source to install the maximum air pollution control capability which is technically practicable and economically feasible, except that Best Available Control Technology (BACT) shall be utilized. The required BACT analysis is included in Section IV of this permit analysis.
7. ARM 17.8.716 Inspection of Permit. This rule requires that air quality permits shall be made available for inspection by the Department at the location of the source.
8. ARM 17.8.717 Compliance with Other Statutes and Rules. This rule states that nothing in the permit shall be construed as relieving Montana Power - Main Line #4 of the responsibility for complying with any applicable federal or Montana statute, rule or standard, except as specifically provided in ARM 17.8.701, *et seq.*
9. ARM 17.8.720 Public Review of Permit Applications. This rule requires that the applicant notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application for a permit. Montana Power - Main Line #4 submitted an affidavit of publication for August 3, 2001 from *The Independent Record*, a newspaper of general circulation in Lewis and Clark County.
10. ARM 17.8.731 Duration of Permit. An air quality permit shall be valid until revoked or modified as provided in this subchapter, except that a permit issued prior to construction of a new or altered source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit, which in no event may be less than 1-year after the permit is issued.
11. ARM 17.8.733 Modification of Permit. An air quality permit may be modified for changes in any applicable rule or standard adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack which do not result in an increase in emissions because of those changed conditions. A source may not increase its emissions beyond those found in its permit unless the source applies for and receives another permit.
12. ARM 17.8.734 Transfer of Permit. This section states an air quality permit may be transferred from one person to another if written notice of Intent to Transfer, including the names of the transferor and the transferee, is sent to the Department.

F. ARM 17.8, Subchapter 8, Prevention of Significant Deterioration of Air Quality, including, but not limited to:

1. ARM 17.8.801 Definitions. This rule is a list of applicable definitions used in this

subchapter.

2. ARM 17.8.818 Review of Major Stationary Sources and Major Modification -- Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through ARM 17.8.827 shall apply to any major stationary source and any major modification with respect to each pollutant subject to regulation under the Federal Clean Air Act (FCAA) that it would emit, except as this subchapter would otherwise allow.

This facility is not a listed source, and emissions are less than 250 ton/year; therefore, the facility is not considered a major stationary source.

G. ARM 17.8, Subchapter 12, Operating Permit Program, including, but not limited to:

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any stationary source having:
 - a. Potential to Emit (PTE) greater than 100 ton/year of any pollutant.
 - b. PTE greater than 10 ton/year of any one Hazardous Air Pollutant (HAP), PTE greater than 25 ton/year of a combination of all HAP, or lesser quantity as the Department may establish by rule.
 - c. Sources with a PTE greater than 70 ton/year of PM-10 in a serious PM-10 nonattainment area.
2. ARM 17.8.1204 Air Quality Operating Permit Program Applicability. (1) Title V of the FCAA requires that all sources, as defined in ARM 17.8.1204 (1), obtain a Title V Operating Permit. In reviewing and issuing Air Quality Permit #3170-00 for the Montana Power - Main Line #4 facility, the following conclusions were made.
 - a. The facility does not have the potential to emit greater than 100 ton/year of any pollutant.
 - b. The facility does not have the potential to emit greater than 10 ton/year of any individual HAP or 25 ton/year of a combination of all HAPs.
 - c. This source is not located in a serious PM-10 nonattainment area.
 - d. This facility is not subject to any current NSPS.
 - e. This facility is not subject to any current NESHAP standards.
 - f. This source is not a Title IV affected source nor a solid waste combustion unit.
 - g. This source is not an EPA designated Title V source.

III. Emission Inventory

	PM ₁₀	SO _x	NO _x	VOC	CO
Solar Saturn - 1600	1.01	0.04	31.62	2.47	8.81

Solar Saturn - 1600	1.01	0.04	31.62	2.47	8.81
Solar Saturn - 1600	1.01	0.04	31.62	2.47	8.81
Natural Gas-Fired Generator	0.0041	.000245	0.86	.00053	.00861
Natural Gas-Fired Generator	0.0041	.000245	0.86	.00053	.00861
Miscellaneous Building Heaters	0.03	.0022	0.34	0.02	0.15
TOTAL	3.07	0.12	96.92	7.44	26.59

- A complete emission inventory is on file with the Department and is available upon request.

IV. Best Available Control Technology

A BACT determination is required for each new or altered source. Montana Power - Main Line #4 shall install on the new or altered source the maximum air pollution control capability which is technically practicable and economically feasible, except that the BACT shall be utilized. A BACT analysis was reviewed by the Department addressing some of the available methods for controlling NO_x and CO emissions from the Solar Saturn turbine-driven compressors. The Department reviewed previous BACT determinations for compressor turbines before making the following BACT determination.

A. NO_x Emissions

NO_x emissions from the proposed turbines will be produced primarily by thermal NO_x formation with some influence by prompt and fuel NO_x formation. Thermal NO_x results when the intense heat of combustion causes atmospheric nitrogen to combine with atmospheric oxygen (O₂). Maximum NO_x production occurs at a lean fuel to air ratio due to excess oxygen available for reaction with nitrogen in the air and fuel.

The following NO_x control strategies/technologies were reviewed for the current permit action:

- Wet Controls;
- Selective Catalytic Reduction (SCR);
- Dry Low NO_x Combustors; and
- No Additional Control - Proper Design and Operation.

Wet Controls

Wet controls inject water, steam, or water-in-oil emulsion into a flame area of the turbine combustor to act as an inert diluent that lowers the peak flame temperature. Lowering the flame temperature limits thermal NO_x emissions but does not reduce fuel NO_x formation. In fact, wet controls may actually increase the rate of fuel NO_x formation. Controlled NO_x emissions are a function of the amount of water injected and of the nitrogen content of the fuel. NO_x control capabilities are limited by the need to increase water-to-fuel ratios for increased emissions reductions.

In reviewing previous BACT analyses for turbine driven compressors, the Department determined that the cost-effectiveness of wet controls is above industry norms. In addition, wet controls present several potentially adverse environmental impacts. These impacts include a need for a water treatment plant with associated wastewater effluent, increased hydrocarbon and CO emissions from high water-to-fuel ratios, a reduction in turbine fuel efficiency resulting in additional fuel combustion, and although water injection limits thermal NO_x, fuel NO_x formation can actually increase.

Overall, cost-effectiveness and potential environmental impact show that wet control strategy is an infeasible option. The Department determined that, for the proposed project, wet controls will not constitute BACT. Wet controls have not been required of other recently permitted similar sources.

Selective Catalytic Reduction (SCR)

SCR is a post-combustion gas treatment technique that uses a catalyst to reduce NO and NO₂ to molecular nitrogen, oxygen, and water. Ammonia (NH₃) is commonly used as the reducing agent.

NH₃ is vaporized and injected into the flue gas upstream of the catalyst bed. The NH₃ combines with the NO_x at the catalyst surface to form an ammonium salt intermediate. The ammonium salt intermediate then decomposes to produce elemental nitrogen and water.

The catalyst lowers the temperature required for the chemical reaction between NO_x and NH₃. Catalysts used for NO_x reduction can include base metals, precious metals, and zeolites. Commonly, the catalyst is a mixture of titanium and vanadium oxides.

An attribute common to all catalysts is the narrow “window” of acceptable system temperatures. In this case, the temperature “window” is approximately 450 to 850°F. Below 450°F, the NO_x reduction reaction will not proceed, while operation above 850°F will shorten catalyst life and can lead to the oxidation of NH₃ to either nitrogen oxides or possibly generating explosive levels of ammonium nitrate in the exhaust gas.

Technical factors that impact the effectiveness of this technology include the catalyst reactor design, operating temperature, type of fuel fired, sulfur content of the fuel, design of the NH₃ injection system, and the potential for catalyst poisoning.

In reviewing previous BACT analyses for turbine driven compressors, the Department determined that, for the proposed project, SCR does not constitute BACT. SCR has not been required of other recently permitted similar sources.

Dry Low NO_x Combustors

Dry low NO_x combustion systems reduce NO_x formation by controlling the mixing of fuel and air to provide low excess air firing or off-stoichiometric combustion. These burners are designed to reduce peak flame temperature and/or reduce the residence time at high temperatures. In all gas turbines, the high temperature combustion gases are cooled with dilution air that is added sooner than with standard combustors. This dilution air promptly cools the hot gases to temperatures below the thermal NO_x formation threshold.

Because Montana Power - Main Line #4 proposes to install turbines that have emission characteristics similar to lean burn technology configured on natural gas-fired reciprocating engines, the Department determined that dry low NO_x combustors will not constitute BACT in this case.

No Additional Control - Proper Design and Operation

Montana Power - Main Line #4 proposed that the use of no additional controls should constitute BACT for the three new 1600-hp Solar Saturn Turbines. The NO_x emissions from the three new turbines are nearly equivalent to catalyst performance, and the turbines operate similarly to natural gas-fired reciprocating engines that use lean burn technology to control NO_x emissions; therefore, the Department determined that the proper installation and operation of the three 1600-hp Solar Saturn turbines shall constitute BACT in this case.

B. CO Emissions

In an ideal combustion process, all of the carbon and hydrogen contained within the fuel are oxidized to form carbon dioxide (CO₂) and water (H₂O). Emission of CO in a combustion process is the result of incomplete organic fuel combustion. CO emissions can be caused by poor fuel-air mixing, flame quenching, and low residence time.

The following CO control strategies/technologies were reviewed for the current permit action:

- Oxidation of Post Combustion Gases; and
- No Additional Control – Proper Design and Operation.

Oxidation of Post Combustion Gases

Although various specialized technologies exist, fundamentally, oxidizers or incinerators use heat to destroy CO in the gas stream. Oxidation controls, like combustion processes, ideally break down the molecular structure of an organic compound into CO₂ and H₂O. Temperature, residence time, and turbulence of the system affect CO control efficiency. Incinerators have a potential for very effective CO control; however, this efficiency comes at the expense of increasing NO_x production.

In reviewing previous BACT analyses for turbine driven compressors, the Department determined that the cost-effectiveness of oxidation of post combustion gases is above industry norms and will not constitute BACT in this case. Oxidation of post combustion gases has not been required of other recently permitted similar sources.

No Additional Control – Proper Design and Operation

Montana Power - Main Line #4 proposed that the use of no additional controls should constitute BACT for the three new 1600-hp Solar Saturn Turbines. The CO emissions from the three new turbines are nearly equivalent to catalyst performance, and the turbines operate similarly to natural gas-fired reciprocating engines that use lean burn technology to control CO emissions; therefore, the Department determined that the proper design and operation of the three 1600-hp Solar Saturn turbines shall constitute BACT in this case.

In summary, the department determined that no additional control, using good combustion practices, will constitute BACT for CO and NO_x emissions resulting from operation of the three natural gas fired turbines.

The control options selected have controls and control costs comparable to other recently permitted similar sources and are capable of achieving the appropriate emission standards.

V. Existing Air Quality and Monitoring Requirements

The existing air quality of the area is expected to be in compliance with all state and federal requirements. Montana Power submitted ambient air quality modeling with the current permit application for Montana Power - Main Line #4. The modeling analysis included the use of two EPA guideline models, ISC3 and COMPLEX I. The modeling that was submitted was conducted for approximately 132.50 tons per year of NO_x for Location 1 and 127.4 tons per year of NO_x for Location 2. This modeling, at conservative NO_x emission levels, did not show violations of the annual or hourly ambient standards. The modeling analysis demonstrates that this facility will not cause a violation or exceedance of any state or federal ambient standard.

VI. Taking or Damaging Implication Analysis

As required by 2-10-101 through 105, MCA, the Department conducted a private property taking and damaging assessment and determined there are no taking or damaging implications.

VII. Environmental Assessment

A Draft Environmental Impact Statement is being prepared for this project by the Department.